In the Claims:

1. (currently amended) A method for detecting the presence of a target substance in a solution comprising the steps of:

providing a sensing device to sense the photo-induced charge movements consisting of isometric change or the ejection of electrons, protons or OH^- ions and resulting from illumination of a dye which is in contact with said target substance;

placing said target substance in contact with said dye;

illuminating said dye;

detecting and analyzing said photo-induced charge movements.

2. (original) The method of claim 1, further comprising the steps of:

choosing a dye which produces photo-induced charge movements upon illumination and which produces a different amount of photo-induced charge movements upon illumination when in contact with said target substance.

3. (original) The method of claim 1, further comprising the step of adsorbing said dye onto a membrane.

4. (original) The method of claim 1, further comprising the steps of:

detecting and analyzing the photo-induced charge movements resulting from illumination of said dye when not in contact with said target substance;

comparing the results from illumination of said dye when not in contact with said target substance to the results obtained from illumination of said dye when in contact with said target substance.

5. (original) The method of claim 4, further comprising the steps of:

successively detecting and analyzing the photo-induced charge movements resulting from illumination of said dye when in contact with different concentrations of said target substance;

comparing the results from illumination of said dye when in contact with said target substance to the results obtained from illumination of said dye when in contact with different concentrations of said target substance to determine the concentration of said target substance.

6. (original) The method of claim 1, wherein said illumination step is performed with a duration of milliseconds or less.

7. (original) The method of claim 1, wherein said illumination step is performed over a chosen wavelength range.

8. (original) The method of claim 1, wherein said dye is formed as a self-assembling monolayer.

9. (original) The method of claim 3, wherein said dye is a first dye and said target substance is a first target substance, and further comprising the steps of:

providing at least one different dye from said first dye and adsorbing said at least one different dye onto said membrane, wherein said at least one different dye produces photo-induced charge movements upon illumination and which produces a different amount of photo-induced charge movements upon illumination when in contact with said different target substance;

placing said different target substance in contact with said at least one different dye simultaneously with placing said first target substance in contact with said first dye;

illuminating said at least one different dye simultaneously with illuminating said first dye;

detecting and analyzing said photo-induced charge movements from said at least one different dye.

10. (currently amended) A method for detecting the presence of a target substance in a solution comprising the steps of:

providing a sensing device to sense the photo-induced charge movements consisting of isometric change or the ejection of electrons, protons or OH^- ions and resulting from illumination of a dye which is in contact with said target substance;

choosing a dye which produces photo-induced charge movements upon illumination and which produces a different amount of photo-induced charge movements upon illumination when in contact with said target substance;

adsorbing said dye onto a membrane;

illuminating said dye;

detecting and analyzing the photo-induced charge movements resulting from illumination of said dye when not in contact with said target substance to provide a baseline value;

placing said target substance in solution in contact with said dye;

illuminating said dye;

detecting and analyzing the photo-induced charge movements resulting from illumination of said dye when in contact with said target substance;

comparing the baseline value results from illumination of said dye when not in contact with said target substance to the results obtained from illumination of said dye when in contact with said target substance to determine if said target substance is present.

11. (original) The method of claim 10, further comprising the steps of:

successively detecting and analyzing the photo-induced charge movements resulting from illumination of said dye when in contact with different concentrations of said target substance to produce comparative concentration values;

comparing the results from illumination of said dye when in contact with said target substance to the comparative concentration value results obtained from illumination of said dye when in contact with different concentrations of said target substance to determine the concentration of said target substance.

12. (original) The method of claim 10, wherein said illumination step is performed with a duration of milliseconds or less.

13. (original) The method of claim 10, wherein said illumination step is performed over a chosen wavelength range.

14. (original) The method of claim 10, wherein said dye is formed as a self-assembling monolayer.

15. (original) The method of claim 10, wherein said dye is a first dye and said target substance is a first target substance, further comprising the steps of:

providing at least one different dye from said first dye and adsorbing said at least one different dye onto said membrane, wherein said at least one different dye produces photo-induced charge movements upon illumination and which produces a different amount of photo-induced charge movements upon illumination when in contact with a different target substance;

placing said different target substance in contact with said at least one different dye simultaneously with placing said first target substance in contact with said first dye;

illuminating said at least one different dye simultaneously with illuminating said first dye;

detecting and analyzing said photo-induced charge movements from said at least one different dye.

16. (original) The method of claim 10, wherein said dye is a first dye and said target substance is a first target substance, further comprising the steps of:

successively detecting and analyzing the photo-induced charge movements resulting from illumination of said first dye when in contact with different concentrations of said first target substance to produce comparative concentration values;

comparing the results from illumination of said first dye when in contact with said first target substance to the comparative concentration value results obtained from illumination of said first dye when in contact with different concentrations of said first target substance to determine the concentration of said first target substance

providing at least one different dye from said first dye and adsorbing said at least one different dye onto said membrane, wherein said at least one different dye produces photo-induced charge movements upon illumination and which produces a different amount of photo-induced charge movements upon illumination when in contact with a different target substance;

placing said different target substance in contact with said at least one different dye simultaneously with placing said first target substance in contact with said first dye;

illuminating said at least one different dye simultaneously with illuminating said first dye;

detecting and analyzing said photo-induced charge movements from said at least one different dye;

successively detecting and analyzing the photo-induced charge movements resulting from illumination of said at least one different dye when in contact with different concentrations of said different target substance to produce comparative concentration values;

comparing the results from illumination of said at least one different dye when in contact with said different target substance to the comparative concentration value results obtained from

illumination of said at lest one different dye when in contact with different concentrations of said different target substance to determine the concentration of said different target substance.

17. (currently amended) An apparatus for detecting the presence and concentration of a target substance in a solution through differences in photo-induced charge movements between a control solution and a target solution containing the target substance, wherein a dye is utilized which produces photo-induced charge movements upon illumination and which produces a different amount of photo-induced charge movements upon illumination when in contact with said target substance, the apparatus comprising:

a light source for illumination;

a container to receive a target solution containing a target substance;

a membrane disposed within said container ~~and having an adsorbed;~~

a dye adsorbed onto said membrane which produces photo-induced charge movements upon illumination and which produces a different amount of photo-induced charge movements upon illumination when in contact with said target substance, said dye being in contact with said target solution;

an electrometer in electrical communication with said membrane to detect said photo-induced charge movements relative to said membrane and to generate a signal for analysis;

means to analyze said signal to determine the presence and concentration of said target substance.

18. (original) The apparatus of claim 17, wherein said light source is chosen from the group of light sources consisting of lasers, stroboscopes and LEDs.

19. (original) The apparatus of claim 17, wherein said membrane is self-assembled monolayer.

20. (original) The apparatus of claim 17, where said analyzer means is an oscilloscope.